SMART 2000: Army Simulation and Modeling for Acquisition, Requirements and Training

PST: Collaborative Environments at Work

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Why We Model

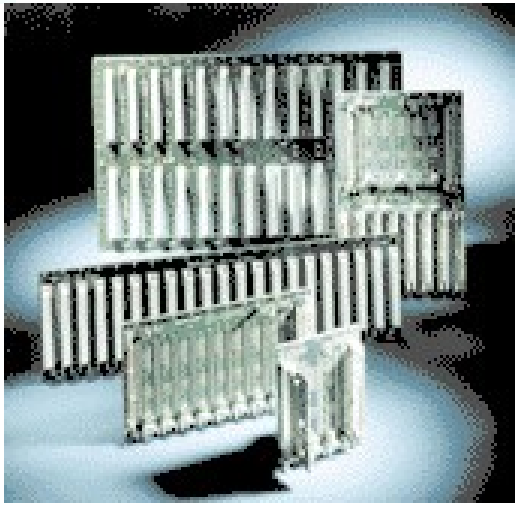
- Acquisition
  - Lower system life cycle costs
  - Provide warfighter with improved systems
- Requirements
  - Provide warfighter with what is needed at best possible cost
- Training
  - Train as we fight, fight as we train

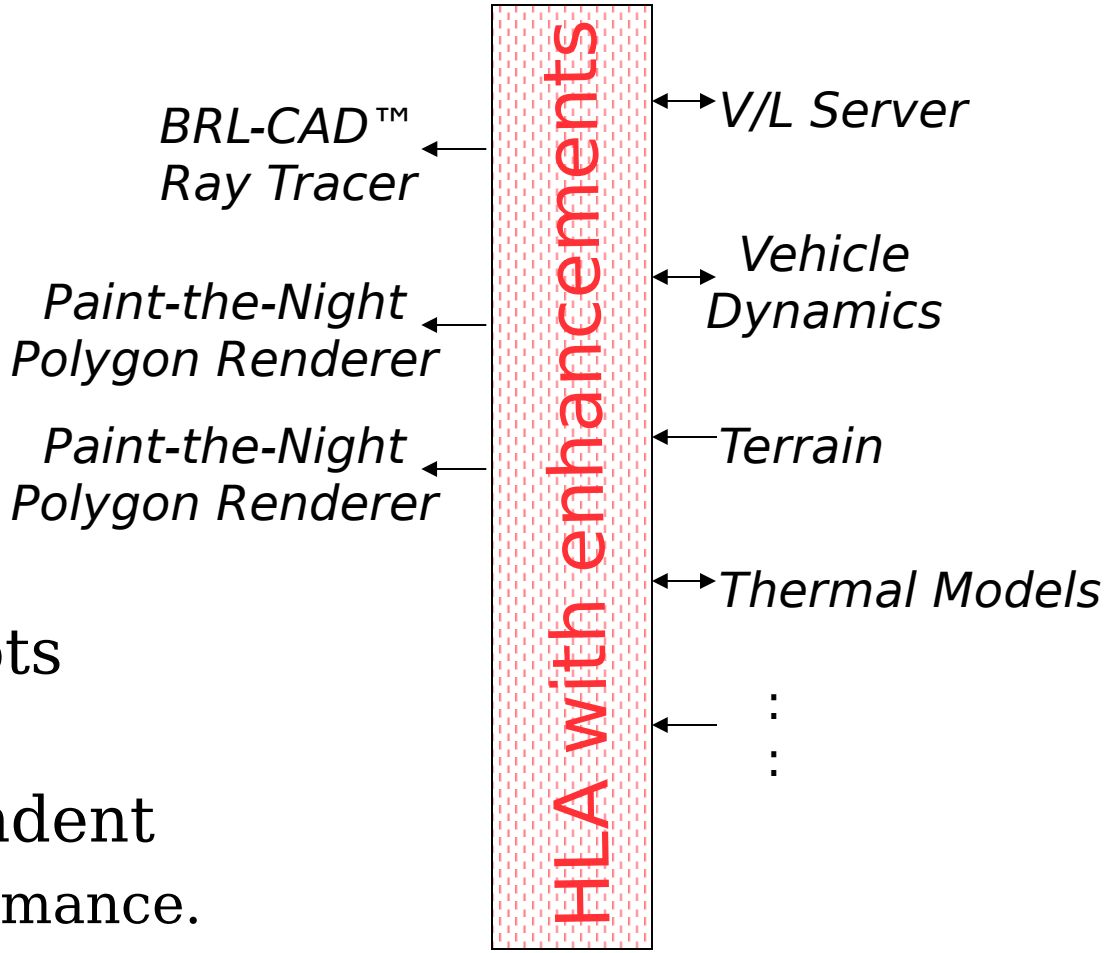
PST

What is PST?

- PST = PTN and SWISS, Together!
  - PTN = Paint-the-Night
    - Real-time polygon rendering
    - From CECOM/NVESD
  - SWISS = Synthetic Wide-band Imaging Spectra-photometer and Environmental Simulation
    - Ray-traced BRL-CAD™ CSG geometry
    - From ARL/SLAD

Backplane Philosophy





- Standardized Slots (Interface).
- Location independent
  - Except for performance.

PST HLA Federations

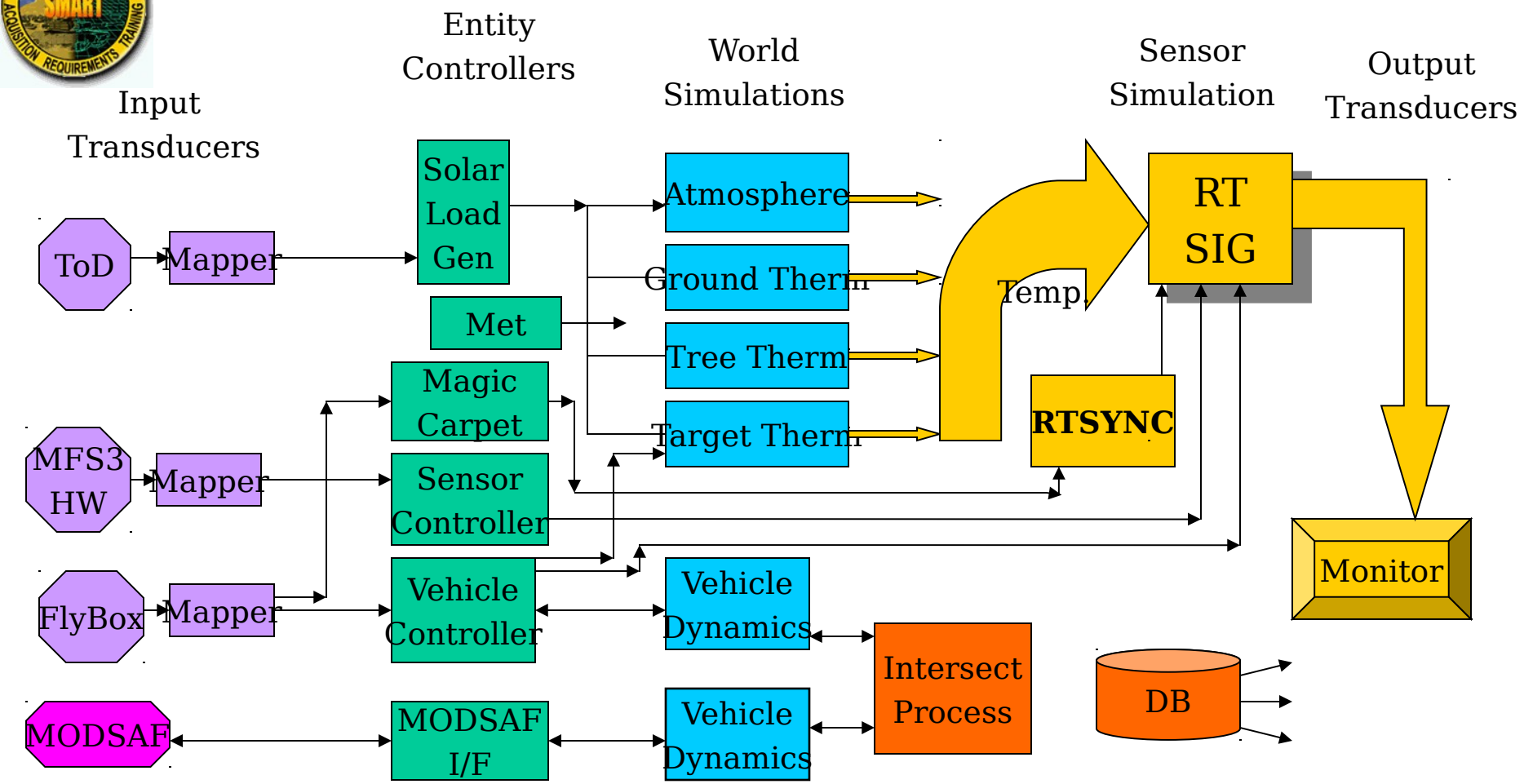
- Current PST Federation
  - Device Federate
  - Sensor Controller Federate
  - Image Generator Federate
  - Sensor Effects Federate
  - SAF Interface Federate
  - SAF Federate
  - Far Target Locator Federate
- Future Federate Integration Work
  - Thermal (ground, trees, vehicles)
  - Survivability/Lethality server
  - Solar System (includes man-made satellites)
  - Atmosphere/Weather
  - Smoke/Obscurants
  - Vehicle/Aircraft Dynamics
  - Weapons

Future HLA Work

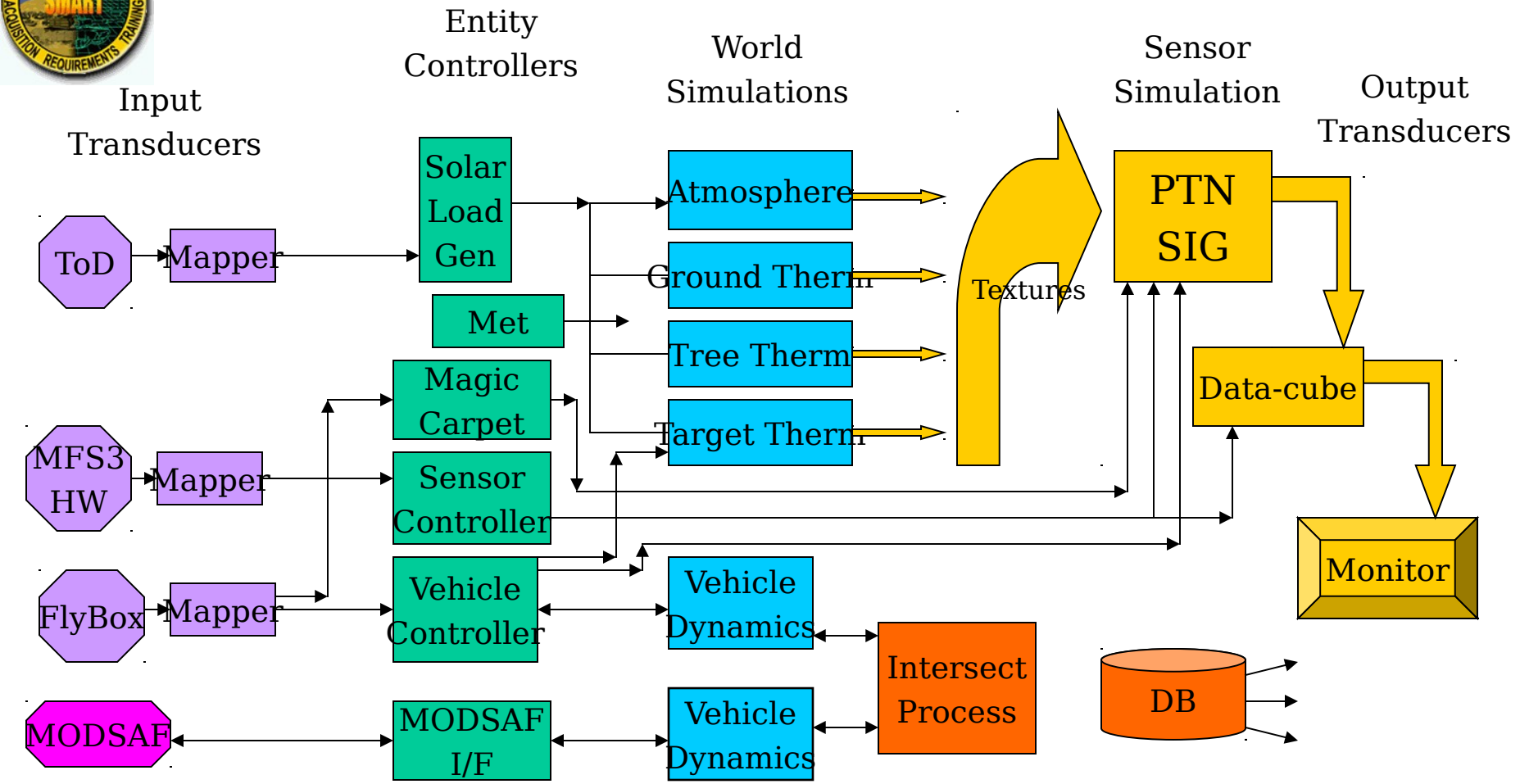
- Bulk data transfer
- Routing capability for point to point communication to support multiple federates of a particular type (federate name-based routing space).
- Dynamic Terrain

Conceptual Diagram

PST Simulation with RT

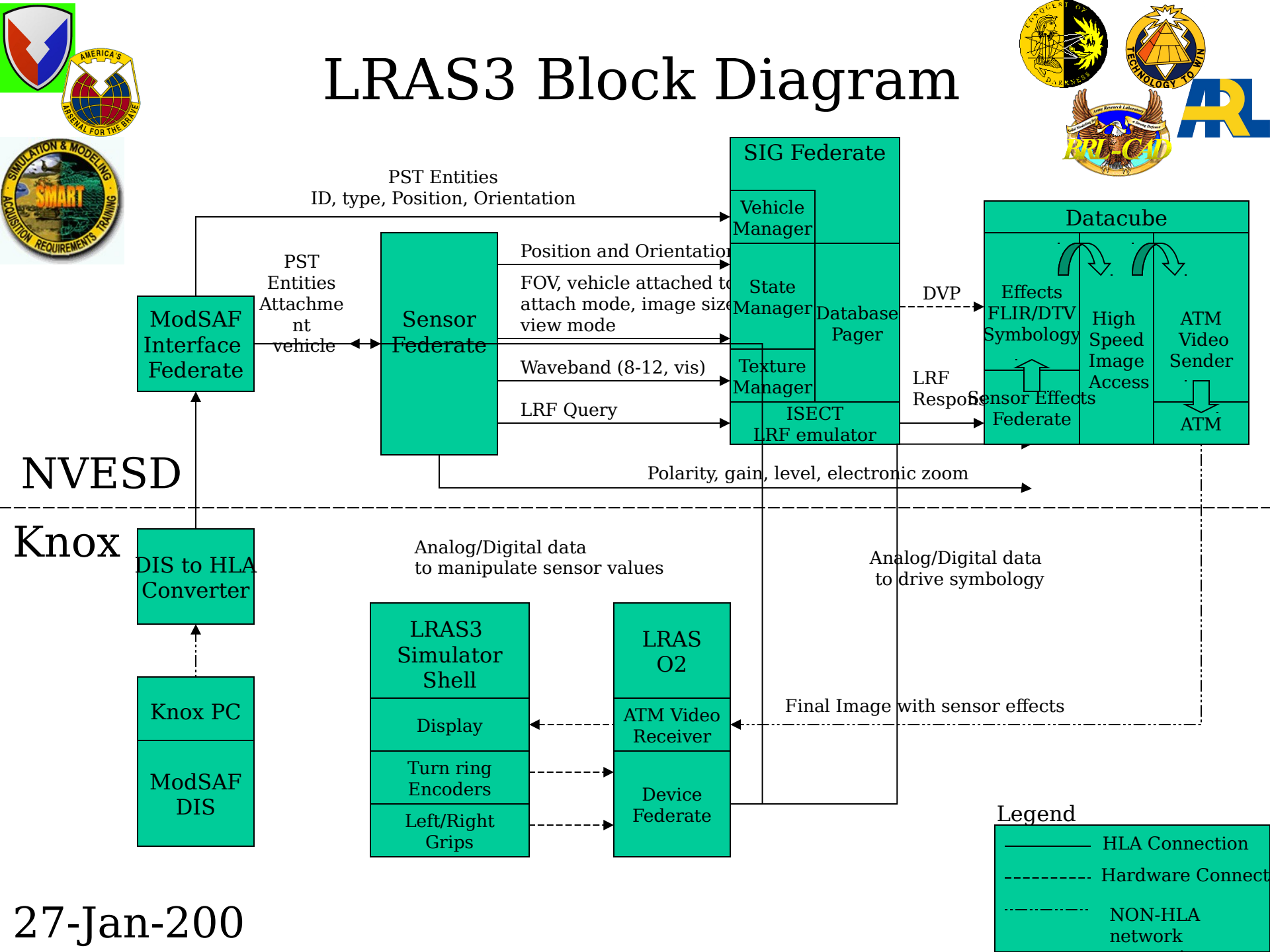


PST Simulation with PTN



Application of PST

LRAS3 Block Diagram



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Assets in support of Ft. Knox Experiments

- One SWISS ray-traced image display.
  - For most sensitive tests.
- Multiple PTN polygon image displays.
  - Esp. to test teamwork.
- All in one shared environment: terrain, air:
  - Craters, smoke, haze…
  - Multiple players, threats.
- Ray-tracer in Maryland
  - >200 cpu Origin-2000
- Environment Sim in MD.
  - Cray T916, 16 cpus.
- Three PTN SIGs in VA.
  - Infinite Reality
- Man-in-the-Loop in KY.
  - Digital Image Display

MBONE tools for collaboration

- Sdr
  - Session scheduler
- vic
  - video
- vat
  - audio
- whiteboard
- text

Participants

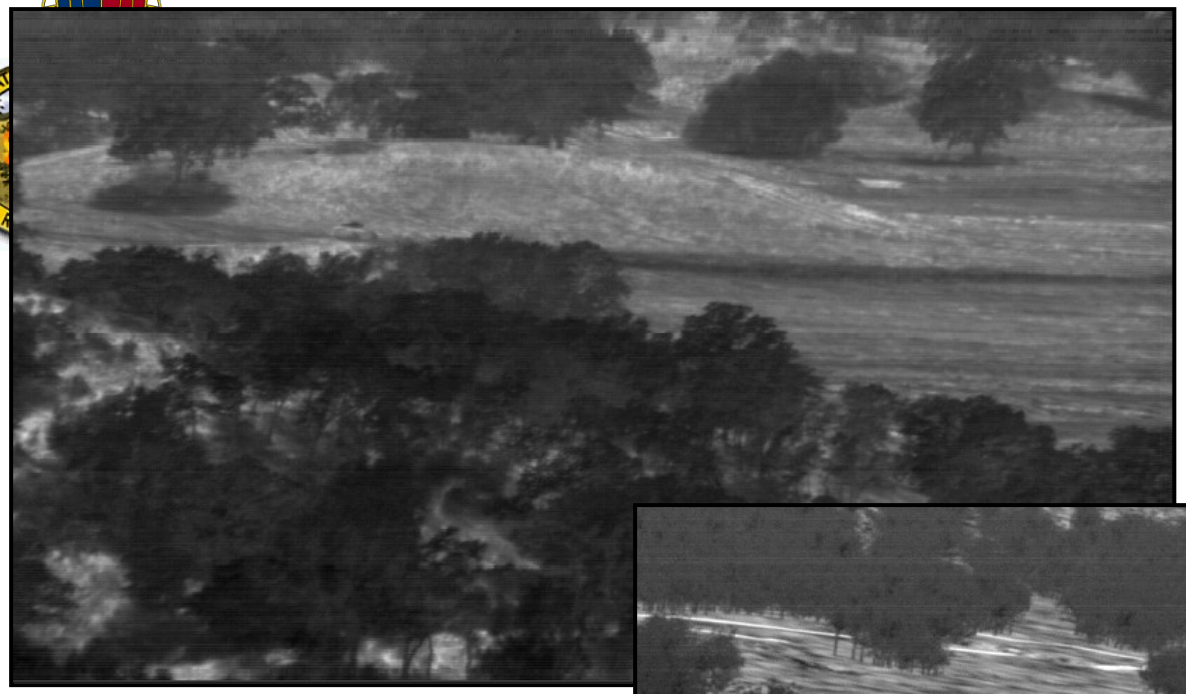
- Army
  - CECOM
  - ARL
  - AMCOM
  - TACOM
  - TECOM
  - STRICOM
  - MMBL
- DoD
  - OSD
  - DMSO
  - DARPA
  - HPCMO
- Industry
  - GDLS
  - UDLP
  - SGI
  - SAIC
  - Raytheon
  - Northrup-Grumman

Results

OSD ATR - Synthetic Scene Generation

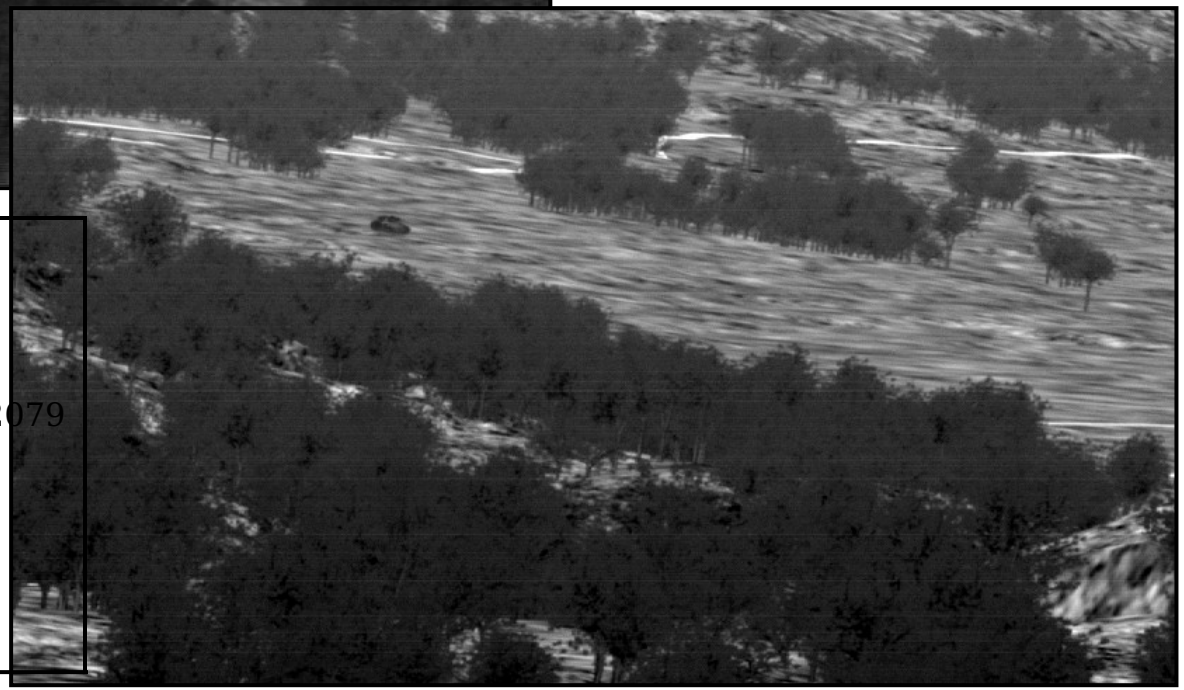
Real vs Synthetic

Hunter Liggett - SGTS



Scene Parameters

Sensor Location -	Site 8
Target -	M3
Time of Day -	16
Date -	6 JUN 95
Sensor Azimuth -	249.3 °
Sensor Elevation -	-3.6 °



Metric Comparison

	PTN	SGTS
Image Mean		1999 2079
Schmeider	25.753	23.326
POE	0.993	0.991
POT	295	317
EPOT	212	39
Contrast	0.029	0.003

Hunter Liggett - PTN

Recommendations

Recommendations

- Begin in earnest, integration of Army modeling and simulation assets
- Provide sufficient resources to execute
- Complete infrastructure to facilitate effort
  - DREN connections